—is very obvious. The field of investigation is of enormous proportions. The assistance of Prof. Houston and his associate, Dr. Kennelly, is promised in entering on an elaborate series of investigations in this direction. Whatever may be the result, we promise ourselves the pleasure of submitting them at a later period to the attention of the Society.

I have also here a few photographs of Dr. Henry Cattell; but as most of them have been published before I do not know whether he would care to show them at present.

Mr. Wharton exhibited a tube containing argon produced by Lord Rayleigh, which was presented by him to Dr. Theodore Wm. Richards, of Harvard University. This tube being arranged for sparking was introduced into the current of a Ruhmkorff coil, where it made a fine display of color.

A number of the members examined this with a spectroscope provided by Dr. Goodspeed, and thus observed very clearly the characteristic lines of argon.

Stated Meeting, March 6, 1896.

President, Mr. FRALEY, in the Chair.

Present, 24 members.

Mr. Henry Pettit, a newly elected member, was presented and took his seat.

Correspondence was submitted as follows:

Letters accepting membership from Dr. A. E. Kennelly, Philadelphia; Prof. William Pitts Mason, Troy, N. Y.; Dr. Henry C. McCook, Philadelphia; Mr. Henry Pettit, Overbrook, Philadelphia.

Letters of acknowledgment from Prof. A. E. Nordenskiold, Ph.D., Stockholm, Sweden (143, 146); R. Accademia di Scienze, etc., Modena, Italy (143, 144, 145, 146); Buffalo Library, Buffalo, N. Y. (148); Dr. Albert P. Brubaker, Philadelphia (147, 148); Hon. J. D. Cox, Cincinnati, O. (148); Colorado Scientific Society, Denver (148); Bishop Crescencio Carrillo, Merida, Yucatan (148).

Accessions to the Library were reported from the Linnean Society of N. S. Wales, Sydney; Société Hollandaise des Sci-

ences, Haarlem, Holland; K. D. Geographische Selskab, Copenhagen; Société R. de Géographie d'Anvers, Belgique; Gesellschaft für Erdkunde, Berlin, Prussia; K. Gesellschaft der Wissenschaften, Göttingen, Prussia; Società R. di Napoli, Italia; Dr. E. T. Hamy, Paris, France; Philosophical Society, Cambridge, Eng.; Theological Seminary, Andover, Mass.; Academy of Natural Sciences, Indian Rights' Association, Prof. William F. Norris, Philadelphia; U. S. Naval Institute, Annapolis, Md.; Agricultural Experiment Stations, Atlanta, Ga.; Las Cruces, N. M.; Historical Society, Los Angeles, Cal.; Observatorio Central, Xalapa, Mexico; M. Alberto Sanchez, San Salvador, C. A.

A crayon portrait (framed) of Hon. Eli K. Price was presented to the Society by J. Sergeant Price, Esq.

The committees appointed to examine the papers, "A New Method of Determining the Perturbations of the Minor Planets," by Wm. McK. Ritter, M.A., and "On the Development of the Mouth Parts of Certain Insects," by John B. Smith, reported in favor of their acceptance, and on motion they were referred to the Publication Committee for action.

Dr. Frazer then read a paper by Dr. Edw. Pepper, entitled "Eucalyptus in Algeria and Tunisia from an Hygienic and Climatological Point of View."

The subject was further discussed by Prof. Houston, Dr. Brinton, Dr. Wm. Pepper, Dr. Frazer, Prof. Cope and Dr. Morris.

Dr. Morris, on behalf of the Curators, acknowledged the receipt of the shadow picture, and the photograph from it, taken by Prof. Goodspeed during his demonstration on Feb. 21, and by permission of the Society was allowed to present his views on the subject.

It seems to me that such pictures should be called, not skiagraphs, or photographs, but electrographs; as they may be produced under various circumstances involving absence of light, but always the presence of some form of electrical energy—such as frictional electricity from the driving belt of a wheel, or a magnet (as has been done in Baltimore), or the direct rays of the sun in the presence of substances opaque to light and heat.

It seems also to me that we have evidence, apparently convincing to our senses, of a current or flow of a stream of some sort through the

Crookes tube, *e. g.*, the rapid rotation of the radiometer when exposed to it. This current or stream, of whatever it may be composed, is striking with great intensity and velocity more than four hundred million times per second against a thin film of glass which is not in a normal condition of equal pressure on both sides—on one side is a vacuum more or less perfect, on the other the whole pressure of the atmosphere. Such rapid blows cannot do otherwise than place the glass in an electrically excited condition—precisely like that of the plate of an ordinary electrical machine. As the exciting cause in this case is a current of negatively electrified molecules of air, the inner surface would be negative, and the outer intensely positive, and this would induce corresponding conditions in all neighboring bodies. The current might be very small, but of very high potentiality; hence would penetrate deeply these surrounding bodies, but would also produce in them all the phenomena of induction. To this excited condition of the glass film of the Crookes tube we may refer the phenomena of phosphorescence, fluorescence and heating, which ensue by the transmutation of forces—just as when a stone is thrown into a pond waves of various size and frequency will be seen to be propagated and interfere with each other. That induction is the cause of the formation of the picture is rendered probable by the fact that the reduction of the silver salt takes place next to the glass of the photographic plate, and not on the free or gelatin surface; and I would suggest as worthy of experiment whether the same effect would not be produced through a series of similar plates and not only on the uppermost one. Prof. McFarlan, of Easton, has shown beautiful results proving the radiation of the energy from the cathode of the tube, which also accord with the induction hypothesis. With regard to the useful applications of these rays, they seem to me to afford a rational explanation of some of the benefits of the currents of induced electricity on nutrition and other vital functions, which those of us who have employed it in our medical practice have often observed without being able fully to explain, and which we can therefore use more intelligently and beneficially hereafter. So also with the effects of the direct sun-rays, or sun-bath, known from ancient times.

The plate shows the edge of the coins and other metallic bodies not clearly defined, but surrounded as if with a shadow, or shading off; this, when examined closely, seems to be composed of fine lines radiating from the coin or metal.

I therefore believe that the phenomena in question will be found to be due to an induction of statical electricity, in great measure if not entirely.

It may be well also to call attention to the fact that while sound, heat and light can be reflected, refracted, transmitted or absorbed, no similar phenomena have as yet been shown as to electric, galvanic or magnetic forces.

New nomination for membership 1346 was read.

The President announced that he had appointed Dr. Pepper, Dr. Frazer, Mr. Ingham, Mr. Jos. C. Fraley and Dr. Hays the Committee for the special meetings agreed upon at the last meeting of the Society.

The Society was adjourned by the President.

Eucalyptus in Algeria and Tunisia, from an hygienic and climatological point of view.

By Dr. Edward Pepper.

(*Read before the American Philosophical Society, March 6, 1896.*)

INDEX.

I.

Division of Algeria and Tunisia into Three Zones as Regards Climate, Water, Trees, Health and Population.

Division of Algeria and Tunisia into three zones as above indicated.

Algeria and Tunisia are properly divided into three zones as regards climatological, hydrological and botanical, as well as hygienic and ethnographic conditions.*

The southern zone, The Sahara, consisting generally of a vast area of sand, moving and yet in parts solidified as by petrifaction (hamada), inhabited by semi-barbarous and roving tribes; and of oases of date-palms, inhabited by settled and less barbarous communities.

The middle zone comprises the high plateaux, or steppes, covered with a wild vegetation (herbaceous, fructiferous and rarely arborescent)

*As regards purely hydrographical conditions, these countries are divided into only two zones: the basin of the Mediterranean and that of the desert, all water not flowing in the one flowing in the other direction. But as regards practical hydrology or hydroscopy and its influence on the climate, these colonies are, as stated, properly divided into three zones here described.